



## REMARKS

### **General:**

Claims 1-18 are pending in this application. Claims 1-12 were rejected. Minor amendments have been made to claims 1, 6, 7, 9, and 10 to comply with U.S. practice. Claims 13-18 are new. Claims 13-18 correspond generally in scope to claims 1- 5 and 8, respectively, but are worded more in accord with U.S. style. No new matter has been added by this amendment.

### **Information disclosure statement:**

An Information Disclosure Statement, accompanied by a substitute form PTO-1449, was filed on May 17, 1999. A copy of the PTO-1449 was returned to applicant's attorneys with the present office action. It is apparent that the examiner has considered the cited prior art, because he relies on one of the references in the present office action. However, the PTO-1449 has not been initialed to confirm that all the cited references have been considered. A further copy of the PTO-1449 is filed herewith, and the examiner is respectfully requested to initial and sign it as specified in MPEP § 609 C(2) and return it to applicant's attorneys.

### **35 U.S.C. § 103 rejections:**

"The examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness. If the examiner does not produce a *prima facie* case, the applicant is under no obligation to submit evidence of nonobviousness." MPEP § 2142. "To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991)." Id.

In the present case, an essential feature of the claimed invention is that the magnetic field is not only variable in direction, but has a variable angular velocity. There is no disclosure or suggestion of that feature in any of the reference on which the examiner relies, all

of which disclose only a field of fixed direction or a steadily rotating field. Thus, the third Vaeck factor is not present, and the examiner has not made out a *prima facie* case of obviousness. *A fortiori*, there is no suggestion in the prior art to provide that feature in combination with the other features of the claimed invention. Thus, the first Vaeck factor is not present, and the examiner has not made out a *prima facie* case of obviousness. Indeed, the examiner has not pointed to any suggestion to combine a variable magnetic field magnitude and a variable field direction at all. The cited references consistently treat those features as alternatives, and apparently mutually exclusive alternatives. See, for example, U.S. Patent No. 4,865,747 (Larson et al.) which explicitly states that “the magnetic field lines across which the fluid flows must vary in direction or magnitude,” col. 1, lines 17-19, emphasis added. For this reason also, the first Vaeck factor is not present, and the examiner has not made out a *prima facie* case of obviousness. Nor, of course, is it possible to derive from the cited references a reasonable expectation of success for a combination of features some of which the prior art treats as mutually exclusive alternatives, and some of which are not suggested by the prior art at all, so the second Vaeck factor is not present either.

The examiner repeatedly contends that features recited in the claims constitute “adjustability” and are therefore unpatentable, citing In re Stevens, 101 USPQ 284 (CCPA 1954). First, what is at issue here is not “adjustment” in the sense in which it is used in In re Stevens. In that case, it was known that different users would want the hand grip and the finger hook in different positions, and the adjustment merely made it easier to set the hand grip and the finger hook in the positions desired by a particular user. Once the hand grip and the finger hook had been adjusted to a specific position, they would be fixed in that position for use. The adjustable fishing rod merely substituted for a choice of alternative simple fishing rods. That is fundamentally different from the present invention, in which the magnetic field is intended to vary **while the device is in use**, and the variation provides a significant part of the operative effect of the device, indeed, the rate of change of the magnetic field is of considerable importance.

Second, In re Stevens does not say that making something adjustable is always unpatentable. In this respect, both the USPQ headnotes and the summary at MPEP § 2144.04 V.D are misleading. What the CCPA actually says is “[w]e have **in many cases** noted that the provision of adjustability, **where needed**, is not a patentable advance.” Id. at 285, emphasis

added. That language both imports the necessary finding of expectation and suggestion by finding that there was a recognized need in the prior art for the claimed fishing rod, and emphasizes that there is no *per se* rule that adjustability is unpatentable. The Court also found by a detailed review of the prior art that it was already known to provide a fishing rod with a hand grip with an adjustable angle, and it was already known to provide a fishing rod with an adjustable finger hook. What was held to be obvious was merely the combination of the two known adjustments in a single rod, and the choice of a generally-known universal joint to provide one of those adjustments. In the present case, the examiner has not shown any suggestion or motivation in the prior art that would lead a person of ordinary skill to introduce variable amplitude to Takahashi's device, and has not made out a *prima facie* case of obviousness.

Claims 1, 3-5, 9, and 11-12 were rejected as obvious over JP 63-277778 A (Takahashi et al.). (The examiner is respectfully reminded that Japanese personal names are conventionally written with the surname first, and that a Japanese patent publication number is usually ambiguous unless the document type letter is included.) Takahashi appears to disclose a device similar to BE 461,600, described on page 3, lines 22-25 of the present application, in which a polyphase supply to a multipole stator produces a revolving magnetic field of substantially constant amplitude, moving at a substantially constant rate of rotation.

The present invention as claimed in claim 1, in contrast, provides a device in which both the amplitude of the field and the angular velocity of the direction of the field vary over time, in order to make the vector product of the field intensity and the field displacement velocity highly variable. There is no disclosure or suggestion in Takahashi of those features. Indeed, Takahashi teaches away from the present invention, by providing a fairly elaborate arrangement for generating a smoothly-rotating field. As discussed above, In re Stevens is not believed to support the examiner's position.

For all of the above reasons, it is believed that the present invention, as now claimed in claim 1, was not obvious over Takahashi. Claims 3-5, 9, and 11-12 are dependent from claim 1 and, without prejudice to their individual merits, are believed to be allowable over Takahashi for the same reasons as claim 1.

With reference to claims 3 and 5, the examiner cites page 500 of Takahashi as teaching "currents having variable frequencies (60 Hz, 50 Hz or below)." If the examiner

wishes to maintain this position, the examiner is respectfully requested to provide an English translation of the relevant passage from Takahashi. Applicant's attorney believes that the sentence bridging the second and third quadrants on page 500 in fact says approximately:

“The source of electricity for the magnetic field is not restricted to the commercial 50 Hz or 60 Hz supply; rather, a low frequency supply of less than 50 Hz used with an inverter, cycloconverter, or the like is preferred, and the disadvantages of a rotary power supply are then scarcely a problem.”

Thus, there is a choice of incoming power supply, which is then converted to the supply needed for the magnet coils, but there is no suggestion that the actual feed to the magnet coils is in any way variable.

The examiner cites Figs. 5-6 of Takahashi as teaching “sinusoidal currents of ... different frequency and being shifted in phase.” That is, of course, impossible, because if the frequencies were different the currents could not have a well-defined phase shift, and is not claimed. In fact, Figs. 5 and 6 of Takahashi each show currents of equal frequency and constant phase-shift combining to produce a resultant field. (The sum curves B in Fig. 5 and C in Fig. 6 are apparently for the magnitude of a vector component of the resultant field, but it is clear from the vector diagrams in Figs. 3 and 4 that a revolving vector field of constant magnitude is in fact produced.) For these reasons also, the device as recited in claims 3 and 5 is believed to be non-obvious over Takahashi.

Claims 1 and 3-12 are rejected as obvious over U.S. Patent No. 4,865,747 (Larson et al.). The examiner cites col. 1, lines 11-19 of Larson as teaching a device “wherein the magnetic fields vary in direction and amplitude.” As noted above, what that passage actually says is that in prior art devices “the magnetic field lines across which the fluid flows must vary in direction **or** magnitude” (emphasis added). Larson himself teaches a device in which the direction of the field lines is fixed, and the magnitude varies, because he uses a single-phase AC field current. There is no suggestion in Larson of a device in which both the direction and the magnitude of the field vary, as required by claim 1 of the present application. Further, there is no suggestion in Larson of a device in which the angular velocity of a field itself varies, as required by claim 1 of the present application. As noted above, Larson mentions varying direction only briefly, and is himself concerned with fields of fixed direction.

The examiner asserts that “Larson is silent with respect to a predefined angle between the directions of the first and second magnetic fields.” That is not correct. The examiner states that “the first and second means for generating magnetic fields are electromagnetic coils (see col. 3, lines 62-68).” Those coils are the coils 13 of Figs. 1 & 2, described in almost identical terms at col. 4, lines 52-56. Those coils are coaxial, see col. 6, line 22, forming Helmholtz coils, see col. 6, line 25. Thus, the angle between the magnetic fields from the two coils is predefined: it is required to be zero. (At col. 6, lines 19 and 22, the coils 13 are referred to as coils 31. The coils are *outside* the conduit 11. Item 31 is a corkscrew-shaped core *inside* the conduit.)

In re Stevens is not believed to assist the examiner. In addition to the reasons set forth above, the difference from the prior art noted by the examiner clearly does not constitute “adjustability of parts” on any reasonable interpretation of that phrase. Larson has one structure, a pair of coaxial Helmholtz coils producing a single, fixed magnetic field. The present invention has a different structure, two means for generating magnetic fields subtending a predefined angle between them, which produces a different effect by different means.

For all of the above reasons, it is believed that the present invention, as now claimed in claim 1, was not obvious over Larson. Claims 3-12 are dependent from claim 1 and, without prejudice to their individual merits, are believed to be allowable over Larson for the same reasons as claim 1.

With reference to claims 3-5, the examiner asserts that Larson “is silent as to the current amplitude, frequency, and form.” This is incorrect. Larson teaches a 20V, 5 MHz radio frequency current (col. 7, lines 18 and 23) and a 120V, 60 Hz sinusoidal current (col. 7, lines 46-47). The examiner then asserts that “adjustability of parts is not patentably distinct over prior art.” The examiner does not explain why this is relevant to any of claims 3-5, and applicant does not believe that the examiner has made out a *prima facie* case of obviousness of any of those claims.

With reference to claim 8, the examiner contends that it would have been obvious to optimize the position of the magnetic field by means of routine experimentation. The examiner cites three cases, all taken from MPEP § 2144.05 II “Optimization of Ranges.” However, as the MPEP points out, “[a] particular parameter must first be recognized as a result-effective variable ... before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation. In re Antonie, 559 F.2d 618, 195 USPQ 6

(CCPA 1977).” What is in issue in claim 8 is the angle between the plane within which the magnetic field moves and the direction of flow of the fluid. In Larson no such plane even exists, because the magnetic field does not move. There is no way in which it could have been recognized from Larson that this angle, which does not even exist in Larson, is an available variable, still less that it is a result-effective variable.

For these reasons also, it is believed that the present invention as claimed in claims 3-5 and 8 is not obvious over Larson.

The examiner rejects claims 1-2 and 6-9 as being obvious over U.S. Patent No. 438,579 (Faunce et al.) Faunce discloses a device with an electromagnet B, energized by a constant DC current from source D, and a permanent magnet B'. Because the permanent magnet B' is mounted on the end of the core of the electromagnet B, it appears that the electromagnet is intended simply to enhance the field of the permanent magnet, see page 2, lines 66-70. There is no suggestion that either magnet is variable, either as to the direction or as to the strength of its field. Thus, Faunce does not teach or suggest a resultant field of variable magnitude, or a resultant field of variable direction, still less a resultant field the direction of which moves at variable angular velocity, all of which are essential features of the invention as claimed.

For all of the above reasons, it is believed that the present invention, as now claimed in claim 1, was not obvious over Larson. Claims 2 and 6-9 are dependent from claim 1 and, without prejudice to their individual merits, are believed to be allowable over Larson for the same reasons as claim 1.

With reference to claim 2, the examiner points out that Faunce discloses a device with one permanent magnet and one electromagnet. However, as explained above, it is believed that in Faunce the two magnets merely supplement one another, with the electromagnet being used only when it is desired to enhance the strength of the permanent magnet. It is submitted that it would not have been obvious from Faunce to use a permanent magnet and an electromagnet in a side-by-side arrangement. The obvious thing would be to use in each place a permanent magnet supplemented by an electromagnet.

With regard to claim 8, for the reasons explained above it is believed that In re Stevens does not support the examiner's position.

With regard to claim 9, it is pointed out that the expression “magnetic field plane” in claim 9 clearly has the meaning assigned to the same expression in claim 1, that is to

say, the common plane of the two imposed magnetic fields, within which plane the resultant field vector moves. Because Faunce does not disclose any variable field, it does not possess even one such plane. Even supposing that the pattern of magnetic fields around the star B' could be regarded as defining one or more magnetic field planes, there is no suggestion that pattern could define several **parallel** magnetic field planes, as recited in claim 9. In this connection the examiner will recall that the rings C and Z are purely galvanic, and are not adapted to generate any magnetic field.

For these reasons also, the device as recited in claims 3, 8, and 9 is believed to be non-obvious over Faunce.

New claims 13-17, and 18 are believed to be allowable over the cited references for the same reasons set out above with respect to claims 1-5, and 8, respectively.

***Conclusion:***

For all of the above reasons, it is believed that the present invention, as claimed in claims 1-18, is patentable over the cited references. Reconsideration of the examiner's rejections and an early notice of allowance are earnestly solicited.

## MARKED UP COPIES OF AMENDED CLAIMS

1. (Amended) A device for generating a magnetic field moving in at least one magnetic field plane located in a given medium and in which the vector product of the intensity of the magnetic field by its natural displacement velocity creates stereochemical deformations in the molecules of said given medium;

said device [being characterised in that] comprising: at least a first means for generating a first magnetic field and a second means for generating a second magnetic field [are] placed in each magnetic field plane, the directions of said first and second magnetic fields subtending between them a predefined angle [?] and at least one of said first and second magnetic fields being of an amplitude which can be varied over time so that the resultant of said first and second magnetic fields is a magnetic field moving in said field plane having an amplitude which is variable over time and a direction moving at a variable angular velocity so as to obtain as high a gradient as possible of said vector product.

6. (Twice amended) A device as claimed in claim 1, in which said given medium is a fluid flowing through a pipe, said first and second means for generating a magnetic field being disposed on the exterior of said pipe [(figures 1 and 6A)].

7. (Twice amended) A device as claimed in claim 1, in which said given medium is a fluid flowing through a pipe, said first and second means for generating a magnetic field being disposed inside said pipe [(figure 8)].

9. (Twice amended) A device as claimed in claim 1, having several parallel magnetic field planes [(figures 9 and 10)].

10. (Twice amended) A device as claimed in claim 1, in which said means for generating a magnetic field of variable amplitude comprises a pair of coils having a core of a ferromagnetic substance to close the magnetic fields generated by said coils, said core optionally being U-shaped, in which case the magnetic field generated occurs in two parallel planes [(figure 2)], or E-shaped in which case the magnetic field generated occurs in three parallel planes [(figure 3)].



Respectfully submitted,

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BY:

A handwritten signature in black ink, appearing to read 'Daniel A. Monaco', with a long horizontal flourish extending to the right.

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